We claim

1. A process for the continuous preparation of a chemical compound in at least one reactor, wherein at least one of the reactors is a shell-and-tube reactor which has a shell and at least one internal tube located within the shell, wherein at least one of the internal tubes has, at least in part, a noncircular cross section and a helical configuration in the region in which it is surrounded by the shell.

2. The process as claimed in claim 1, wherein the noncircular cross section has both mutually opposite straight sides and mutually opposite round sides or has the shape of an oval or the shape of an ellipse.

3. The process as claimed in claim 1 or 2, wherein the helix has from 1 to 2000 complete turns in the region surrounded by the shell.

4. The process as claimed in any of claims 1 to 3, wherein from 1 to 20 000 internal tubes having a noncircular cross section are located in a helical configuration within the shell.

5. The process as claimed in any of claims 1 to 4, wherein an olefin is reacted with a hydroperoxide in the presence of at least one zeolite catalyst to form an epoxide in the reactor.

6. The process as claimed in claim 5, comprising the stages (i) to (iii)
   (i) reaction of the olefin with hydroperoxide to give a mixture comprising epoxide, unreacted olefin and unreacted hydroperoxide,
   (ii) separation of the epoxide and the unreacted olefin from the mixture resulting from stage (i) to give a mixture comprising unreacted hydroperoxide,
   (iii) reaction of the mixture comprising unreacted hydroperoxide with olefin,

   wherein at least one shell-and-tube reactor as defined in claims 1 to 4 is used for the reaction of the olefin in at least one of the stages (i) and (iii).

7. The process as claimed in claim 6, wherein at least two isothermal shell-and-tube reactors as defined in claims 1 to 4 connected in parallel are used in stage (i) and at least one adiabatic shaft reactor is used in stage (iii), wherein the overall selectivity of the reaction is in the range of from 90 to 96%, based on hydroperoxide, and the total hydroperoxide conversion is at least 99.5%.

8. The process as claimed in any of claims 5 to 7, wherein propene is used as olefin, hydrogen peroxide is used as hydroperoxide and a titanium zeolite catalyst is used as catalyst.

9. The process as claimed in claim 8, wherein the titanium zeolite catalyst has the TS-1 structure and methanol is used as solvent.

10. A shell-and-tube reactor for the continuous preparation of a chemical compound, comprising a shell and at least one noncircular cross-section internal tube located within the shell, wherein at least one of the internal tubes having the noncircular cross section is at least partly helical in the region in which it is surrounded by the shell.

11. The shell-and-tube reactor as claimed in claim 10, wherein the noncircular cross section has both mutually opposite straight sides and mutually opposite round sides or has the shape of an oval or the shape of an ellipse.

12. The shell-and-tube reactor as claimed in claim 10 or 11, wherein the helix has from 1 to 2000 complete turns in the region surrounded by the shell.

13. The shell-and-tube reactor as claimed in any of claims 10 to 12, wherein from 1 to 20 000 internal tubes having a noncircular cross section are located in a helical configuration within the shell.

14. The shell-and-tube reactor as claimed in any of claims 10 to 13, wherein at least one region of at least one of the internal tubes contains at least one fixed-bed catalyst.

15. The shell-and-tube reactor as claimed in claim 14, wherein at least one fixed-bed catalyst is a titanium zeolite catalyst.

16. An apparatus for the continuous preparation of a chemical compound, comprising at least one shell-and-tube reactor according to any of claims 10 to 15.

17. The apparatus as claimed in claim 16 further comprising at least one separation device.

18. The apparatus as claimed in claim 16 or 17, comprising at least two shell-and-tube reactors according to any of claims 10 to 15 connected in parallel, a distillation column downstream of this at least one shell-and-tube reactor and at least one shaft reactor downstream of the distillation column.

19. Use of a shell-and-tube reactor according to any of claims 10 to 15 for improving the selectivity in the preparation of a chemical compound.